

REMARKS

Review and reconsideration on the merits are requested.

Claims 1 and 4-7 are all the claims pending in the application.

Amendments to claims

Applicants change “wherein said intermediate product is a T-shaped intermediate product composed of L-shaped board laminates and said flat board-shaped laminate each said flat board-shaped laminate comprises only one flat board-shaped laminate.” to read --wherein said intermediate product is a T-shaped intermediate product composed of L-shaped board laminates and said flat board-shaped laminate, said L-shaped board laminates and said flat board-shaped laminate being derived from only one flat board-shaped laminate by cutting into a plurality of boards.--, and amend claim 5 by deleting “or a thermoplastic resin” from “a thermosetting resin or a thermoplastic resin”.

The dependency of claims 6 and 7 is changed from claim 3 to claim 5 as claim 3 has been canceled.

In view of the Examiner’s rejection to claims 1 and 4-7 in Paragraph 6 of the Action, claim 1 is combined with amended claim 5 to make amended claim 1, claim 4 is combined with amended claim 1 (combined with claim 5) and amended claim 6 to make amended independent claim 4, and claim 7 is rewritten into independent form by combination with amended independent claim 4.

Rejection of claims 4-7 under 35 U.S.C. § 112, second paragraph

Claims 4 and 5 have been amended in a manner which it is believed avoids the rejection.

However, if the Examiner believe that additional claim limits are necessary of claims 4 and 5, the Examiner is requested to contact the undersigned at the later given telephone exchange.

Rejection of claims 1 and 4-7 under 35 U.S.C. § 103(a) based on McKague et al. (US Patent 5, 954, 898) in view of Hiyamizu et al. (JP 02030518 and its English translation) and DellaVecchia et al. (US Patent 4,296,884)

Amended claim 1

1) With respect to the difference in the process conditions:

One distinguishing feature of amended claim 1 of the present application lies in that the intermediate product made of fiber-reinforced composite is produced by the following steps. In the first step (a) the plurality of sheets made of the fiber-reinforced composite are heated at a temperature of 20-100°C/0.1 to 10 kg/cm², and cooled at a temperature of 10-30°C/0.1 to 10 kg/cm²; and in the third step (c) the board is softened by heating at a temperature of 60-100°C/10-90 minutes placed on a forming tool, and formed by cooling at a temperature of 0-50°C /0.1-10 k /g cm². The intermediate product is a semi-hardened product having a hardening degree of 1 to 80%, where the fiber-reinforced composites are composed of a reinforcing fiber impregnated with a thermosetting resin (emphasis added) (see amended claim 1, page 4, line 24 to page 5, line 3 and page 5, lines 28 of the specification).

In contrast, although McKague teaches that the McKague laminate is generally stored for cutting at room temperature in a low humidity storage environment due to the hygroscopic nature

of composite materials (column 6, lines 8-11), McKague fails to teach any conditions for cooling at 10-30°/0.1 to 10 kg/cm² as defined in step (a) of claim 1 herein. Further, McKague is silent not only regarding the conditions necessary for laminating the stack by heating a plurality of sheets made of the fiber-reinforced composite at a temperature of 20-100°C/0.1 to 10 kg/cm² as defined in first step (a) of claim 1 herein, but is also silent regarding the necessary conditions defined in third step (c) such as heating at a temperature of 60-100°C/10-90 minutes for softening of the board, and cooling at a temperature of 0-50°C/0.1-10 kg/cm² for proper processing and product characteristics (see page 5, line lines 4-11 and lines 15-28 of the specification).

Hiyamizu teaches a device for continuously producing fiber-reinforced composite materials by laminating and pressing a plurality of prepregs at 100-160°C by using a hot roller (English translation of column 2, lines 1-10, and right upper column 16, lines 12-16). This is quite different from the present invention in heating at 20-100°C in step (a), because when the heating temperature is more than 100°C, fluidity of the resin in the fiber-reinforced composite is excessively increased (see page 4, lines 25-27 of the specification). Hiyamizu further fails to teach or suggest a cooling temperature, though the cooling temperature in step (a) of the present invention is set at 10-30°C. For this, the specification of the present application, page 5, explains that:

“When the cooling temperature is more than 30°C, a sheet tends to be peeled off the flat plate-shaped laminate. On the other hand, the cooling temperature of less than 10°C requires much energy for cooling (see page 5, lines 5-8 of the specification).”

DellaVecchia teaches a process for producing a composite laminated sheet including a step of laminating the sheets with laminating rolls at a temperature 10-70°C below the polymer melting point where sets of rolls are maintained at a different temperature, e.g., 5-40°C below and 10-70°C below in each laminating roll set of the laminating rolls (a) to (d) under a pressure of 100-1500 lb/linear inch to form a laminated sheet (see column 2, line 56 to column 3, line 34 and Fig. 1, especially col. 3 at lines 13/14 and lines 30-34), and cooling the laminate 25 at cooling rolls kept at a temperature capable of quickly lowering the temperature of the laminate 25 sufficiently for easy cutting on cutter mechanism 26 (see column 3, lines 43-45, and Fig. 1).

These conditions for laminating and cooling are quite different from those of the present invention defined in first step (a) where the plurality of sheets made of the fiber-reinforced composite are heated at a temperature of 20-100°C/ 0.1 to 10 kg/cm², and cooled at a temperature of 10-30°C/0.1 to 10 kg/cm².

2) With respect to the hardening degree:

Another distinguishing feature of amended claim 1 of the present application is that the intermediate product is a semi-hardened product having a hardening degree of 1 to 80% (amended claim 1), where the fiber-reinforced composite is composed of a reinforcing fiber impregnated with a thermosetting resin.

In contrast, McKague does not specifically teach any composite part formed from a plurality of composite layers having a hardening degree of 1 to 80 %, though McKague describes at column 7:

“Subsequently, heating laminate 82 in oven 80 allows laminate 82 to be formed into a pre-form in tool 84 by the application of force. Laminate 82 maybe shaped

into a pre-form of many shapes as represented by right-angle pre-forms 86 (column 7, about lines 48-53).

Hiyamizu also fails to teach or suggest an intermediate product made of a fiber-reinforced composite as semi-hardened products having a hardening degree of 1 to 80 %.

DellaVecchia also fails to teach or suggest an intermediate product made of a fiber-reinforced composite as semi-hardened products having a hardening degree of 1 to 80 %.

Applicant respectfully submits that considering the above defects, the Examiner has failed to pose a proper case of *prima facie* obviousness. Specifically, Applicant's respectfully submit that the Examiner does not sufficiently explain the basis with respect to the particular details in Hiyamizu and DellaVecchia which would lead one of ordinary skill in the art to meet the limits omitted from McKague which are discussed above. *See in re Rijckaert*, 9F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993).

The Examiner's approach to in the temperature/pressure and degree of hardening limits in the claims appears to be an "obvious to try" approach which is not the standard under §103. In some cases, what would have been "obvious to try" would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful. See, for example, *In re Geiger*, 815 F.2d at 688, 2 USPQ2d at 1278; *Novo Industri A/S v. Travenol Laboratories, Inc.*, 677 F.2d 1202, 1208, 215 USPQ 412, 417 (7th Cir. 1982); *In re Yates*, 663 F.2d 1054, 1057, 211 USPQ 1149, 1151 (CCPA 1981); *In re Antonie*, 559 F.2d at 621, 195 USPQ at 8-9.

Considering all of the above, Applicant's respectively submit that one of ordinary skill in the art, referring to McKague, Hiyamizu and DellaVecchia, alone or in combination, would find no reasonable basis to reach the present invention and, accordingly, claim 1 of the present application is not obvious over these references.

Amended claim 4

Amended claim 4 herein specifically recites a method for producing a semi-hardened "stringer" intermediate product or a semi-hardened "frame" intermediate product. One critical feature of the claimed invention lies in that such an intermediate product is a semi-hardened product having a hardening degree of 1 to 50% (not 1 to 80%), whereby the fiber-reinforced composite composed of a reinforcing fiber impregnated with a thermosetting resin thus produced can be easily handled and stored and has properties suitable for integration with the skin (see 4, lines 9-13 of the specification)

In contrast, McKague discloses, as shown in Fig. 4, pre-forms of intermediate parts (86, 86, 82) for forming a shaped product (90) which presumably has a certain undefined hardening degree. However, the McKague pre-forms are different from semi-hardened product having a hardening degree of 1 to 50% as a final shaped product formed after treatment of the laminated board (corresponding to debulked laminate 82 or right angle pre-forms 86 of McKague) under the conditions for softening and cooling defined in third step (c) of amended claim 4 of the present application.

Hiyamizu discloses a flat board-shaped laminate presumably having a certain degree, again undefined, of hardening. However, Hiyamizu fails to teach or suggest a semi-hardened

“stringer” intermediate product or a semi-hardened “frame” intermediate product having a hardening degree of 1 to 50% as recited in amended claim 4 of the present application.

DellaVecchia also discloses a composite laminated sheet laminate presumably having a certain degree, again undefined, of hardening. However, DellaVecchia fails to teach or suggest a semi-hardened “stringer” intermediate product or a semi-hardened “frame” intermediate product having a hardening degree of 1 to 50% as recited in the amended claim 4 of the present application.

Applicant has discussed the cited references in detail. In short, none of the cited references alone or in combination teach the invention recited in amended claim 4. Thus, even if McKague is modified per Hiyamizu and DellaVecchia, even with such modification the limits of amended claim 4 are not taught.

Amended claim 7

In amended claim 7 of the present application, the hardening degree of the semi-hardened “stringer” intermediate product or the semi-hardened “frame” intermediate product produced by the same method recited in the amended claim 4 is limited from 1-50% to 5-20%, whereby the fiber-reinforced composite thus produced can be easily handled and stored and has properties suitable for integration with the skin of a final product (emphasis added) (see 4, lines 9-13 of the specification).

Applicant has discussed the cited references in detail. In short, none of the cited references alone or in combination teach the invention recited in amended claim 7. Thus, even if

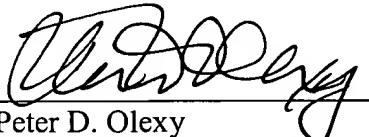
AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Appln. No. 09/832,822

McKague is modified per Hiyamizu and DellaVecchia, even with such modification the limits of amended claim 7 are not taught.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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